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Wahler Associates
Geotechnical and Water Resources Engineering

July 5, 1990
Project GSN-129H

Nolte and Associates
60 South Market Street, Suite 600
San Jose, California 95113

Attention: Mr. Peder Jorgensen

Subject: Preliminary Environmental Survey
Wrigley-Ford Creek Pump Station
Berryessa Creek to Western Pacific Railroad
Milpitas, California

Dear Mr. Jorgensen:

As authorized, Wahler Associates (WA) has completed the preliminary environmental investigation at the Wrigley-Ford Creek Pump Station site. Following is a summary report of our preliminary findings.

EXECUTIVE SUMMARY

Nolte and Associates retained WA to perform an environmental survey for the proposed pump station site. The preliminary scope of work included review of records, including aerial photographs, soil sampling and chemical analysis; installation of one monitoring well, and sampling and chemical testing of the groundwater.

It can be inferred from the investigation that contamination at the site has most likely occurred from oil and grease introduced into fill materials during the construction phase of flood control channels and levees.

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FAX: (415) 968-5365

Although the groundwater has not yet been affected, the total extent of the contamination is not known at this time. It is recommended that further exploration work be performed to define the lateral and horizontal limits of the contamination zone.

If you have any questions or comments regarding the information presented, please do not hesitate to call.

Very truly yours,

WAHLER ASSOCIATES

William Lawson

William A. Lawson
Senior Hydrogeologist

William Lawson

Fred A. Seirafi, REA No. 1088
Principal Engineer
Manager, East Bay Office for

WAL/FAS:C

PRELIMINARY ENVIRONMENTAL SURVEY
WRIGLEY-FORD CREEK PUMP STATION
BERRYESSA CREEK TO WESTERN PACIFIC RAILROAD
MILPITAS, CALIFORNIA

A. INTRODUCTION

Wahler Associates (WA) was retained by Nolte and Associates, on behalf of its client, the Santa Clara Valley Water District (SCVWD), to conduct a preliminary environmental site survey of the area surrounding SCVWD property at the confluence of Wrigley-Ford and Berryessa Creeks in Milpitas, California. As proposed by Nolte and Associates, the pump station will have approximate plan dimensions of 40 feet by 50 feet, and will be founded at about Elevation -9.0 feet, or approximately 26 feet below the top of the existing bank. The pump station will contain three 65,000 gpm pumps and a 9.5-foot deep discharge box. The project will also include a 150-foot long concrete-lined approach channel, a 400-gallon underground fuel storage tank, a 60-inch diameter by-pass pipeline, a 24-inch diameter sump drain, and the rock riprapping of a small section of the creek channel upstream of the pump station. Figure 1 shows the site location.

The results of WA's preliminary environmental site survey are presented below.

1. Scope of Services

The scope of services for the preliminary environmental survey was as follows:

- Site history review: collect and evaluate pertinent data regarding the historical use of the properties and identify known and potential sources of contamination.

- Regulatory agency review: obtain information regarding any recorded environmental infractions on the properties, and obtain information regarding possible contamination of surrounding and nearby properties that could impact the subject site. This would include a review of available reports.

- Site visit to evaluate indications of possible hazardous contamination, and to identify and record potentially hazardous components which may adversely impact the site.

- Shallow soil sampling and chemical analysis; installation of one monitoring well, soil and groundwater sampling and chemical testing.

- Preparation of a report to present the results of the investigation and evaluation of the compiled data, as well as preliminary recommendations regarding any necessary follow-up work.

2. Site Description

The site of the proposed Wrigley-Ford Creek Pump Station is located within Santa Clara Valley Water District's Wrigley-Ford Creek flood control easement at the confluence of Wrigley-Ford and Berryessa Creeks (Figure 1). The site, which currently serves as a levee under which three conduits lie, is bordered on the east by Western Pacific Railway and on the west by private residences within the City of Milpitas. Wrigley-Ford Creek flows north through the site and is joined with Berryessa Creek from the east. Directly north of the site is the Abel Street overpass. The elevation at the crest of the levee is approximately 17.5 feet.

Groundwater was encountered at 19 feet below ground level or at Elevation -1.5, although the groundwater is probably influenced by Wrigley-Ford Creek and Berryessa Creek. Previous subsurface investigations near the site have shown groundwater levels at or near Elevation +5. The regional groundwater gradient is believed to flow in a westerly direction toward San Francisco Bay.

3. Regional Geology

The project site is located near the northern margin of the Santa Clara Valley, about 5 miles southeast of San Francisco Bay. The Santa Clara Valley is a structural depression separating the Santa Cruz Mountains to the southwest and the Diablo Range to the northeast. Alluvial deposits underlie much of the valley floor, and near the project site exceed 500 feet in thickness (Rogers, T.H., and Williams, J.W., 1974, "Potential Seismic Hazards in Santa Clara County, California", California Division of Mines and Geology, Special Report 107). Holocene alluvial fan deposits composed of silty clay, sandy clay, and sand directly underlie the site. Older Pleistocene alluvial fan deposits of coarse sand and gravel underlie the younger Holocene deposits.

Major active faults in the region include the San Andreas which lies along the Coast Range and Santa Cruz Mountains, the Calaveras which lies along the western margin of the Diablo Range, and the Hayward fault which lies about 1.5 miles northeast of the site. All of these faults trend in a northwesterly direction in this region.

B. PRELIMINARY ENVIRONMENTAL SURVEY

1. Site History Review

WA performed a site history review to identify former land uses of the Wrigley-Ford-Berryessa site. Sources of information included Sanborn maps, city directories, aerial photographs and records maintained by the Milpitas Fire Department.

a. Sanborn Maps - These maps are fire insurance maps and were first published in the late 1880's by the Sanborn Company of New York for cities throughout the United States. The maps were revised and updated periodically until about 1950 when the Sanborn Company limited regular revisions. WA reviewed Sanborn maps of Milpitas for the years 1893 to 1908, which were the only ones available. It should be noted that the exact date of any revisions to these maps between the two time periods is unknown.

These series of maps showed the downtown Milpitas area which was located approximately 1-mile upstream from the site near Berryessa Creek (then Penitencia Creek). Several potential contamination sources existed such as underground gasoline and fuel tanks. Due to the age and lateral distance of these sources from the site, it is doubtful that they would have any effect on the site.

b. Aerial Photographs - WA examined historic aerial photographs for the following years:

1954 - The Western Pacific Railroad line is present as well as a two-lane road west of and adjacent to Wrigley-Ford Creek. At the present confluence of Berryessa and Wrigley-Ford Creeks is a small pond. The area west of the roadway contains a large plot which appears to be fallow farm land with bare patches of soil present. In the center of this lot is a rectangular patch of barren land. Areas north, east, and south of the site consist of cultivated farm lands.

1976 - The Abel Street overcrossing is present as well as a housing development which is southwest of the site. The small pond at the confluence of Berryessa and Wrigley-Ford Creeks is gone. The Berryessa Creek flood control channel is under construction. Located at the subject site are several small sheds which may be related to channel construction activities. East of the site is a large area of disturbed soil and some heavy earth-moving equipment, also probably associated with channel construction.

Southwest of the site and up Berryessa Creek is a large pond. Few farms remain, with many having been replaced by housing developments.

1984 - The site appears as it does today with two exceptions: the pond southwest of the site is no longer present and the commercial area east of the site is undeveloped.

c. City Directories - WA reviewed the city directories from 1980 to 1989 and found sites which could be sources of off-site contamination. Due to their location (down-gradient or distance from the site), these sites would probably have little effect on the site. Those sites found to be within 1/2-mile of the site are listed below.

Address	Company	Remarks
1429 Milpitas Blvd.	Prudential Supply	Laundry and cleaning services; greater than 1/2 mile east of the site.
1125 Milpitas Blvd.	Milpitas Materials Co. Rich Minis Trucking	Brick yard, sand and gravel; greater than 1/2 mile east of the site.
130 Winsor	--	Various auto wrecking yards; approximately 3/4 mile south of the site

d. Milpitas Fire Department - WA requested information from the Milpitas Fire Department regarding tank closures and removal from 1990 to present. No tank pulls have been performed within at least a one-half mile radius.

2. Regulatory Agency Review

WA examined several regulatory agency listings of soil and groundwater contamination sites in the vicinity of the site in order to survey potential off-site contamination sources. The regulatory agency listing examined included:

- Regional Water Quality Control Board (RWQCB) Leaking Underground Fuel Tanks (LUFT) sites, January 1990.

  The LUFT list documents fuel hydrocarbon contamination impacting only subsurface soil or both subsurface soil and groundwater.

  WA identified no LUFT sites within one-half mile radius of the site.

- South Bay Site Management System Milestone Report (Milestone Report) by the California Regional Water Quality Control Board, San Francisco Bay Region, from 1987-September 1989.

  The Milestone Report includes groundwater contamination cases in the Santa Clara Valley where the regulatory lead agency is either the U.S. Environmental Protection Agency (EPA), the San Francisco Regional Water Quality Control Board, or the California Department of Health Services (DHS).

  WA identified one contamination case within a one-half mile radius of the site. This site is known as the Doudell property and is located at I-880 and Dixon Landing Road approximately 0.5 miles north of the Wrigley-Ford Creek site. Since the Doudell site is cross and down-gradient, and final remedial measures apparently have been met there, it is unlikely that the Doudell site would affect the Wrigley-Ford Creek site.

C. SITE EXPLORATION

WA conducted an initial site reconnaissance on April 25, 1990. Preliminary locations for soil borings and the monitoring well were selected at that time.

Prior to the start of field work, a Site Safety Plan (SSP) was prepared. The SSP was adhered to during all field operations.

Prior to drilling operations, all augers and sampling equipment were steam-cleaned.

On May 1 and 2, 1990, four soil borings were advanced at the site. These borings were designated WB-1 through WB-3, and MW-1. Figure 2 shows their locations. One of the borings (MW-1) was converted into a monitoring well. Prior to drilling operations and well installations, a well permit was obtained from the Santa Clara Valley Water District.

Drilling was performed by HEW Drilling Company (California Contractor License 384167) of East Palo Alto, California, using a truck-mounted CME 75 drill rig with 8-inch hollow-stem augers. During drilling, each borehole was logged by an experienced WA geologist.

Soil samples were collected and cuttings were examined continuously to identify geologic materials. A lithologic log of each boring was prepared using the Unified Soil Classification System (USCS). These logs were reviewed by a State of California registered geologist or civil engineer. Appendix A contains the boring logs.

Soil samples were collected by driving a 1.5-foot by 2-inch ID California barrel sampler containing three 2-inch by 6-inch brass liners from the borings. Brass liners containing soil samples selected for chemical analysis were immediately sealed with aluminum foil, capped with polyethylene lids, wrapped with aluminized tape, labeled, and stored on ice. In addition, at each sampling location, some of the recovered soil cores were also removed and placed into zip-lock polyethylene bags and screened for volatile organic compounds using a portable photoionization detector (PID). Soil cuttings were placed in labelled 55-gallon drums and left on-site.

Upon completion of drilling at MW-1, the excess depth of the hole was backfilled with bentonite pellets. 2-inch ID slotted (0.010 inch) Schedule 40 PVC casing was placed in the hole at the appropriate depth interval to screen saturated permeable materials. Flush- threaded, solid PVC casing was installed above the screened section to the surface. All PVC casing was thoroughly steam-cleaned prior to insertion into the boring.

After the casing was installed, the hollow-stem augers filled with native flowing sands to approximately 1-foot above the screened interval, therefore, an imported filter pack could not be placed. An approximately one-foot bentonite pellet seal was placed on top of the native sand pack, and a cement or cement/bentonite grout seal was placed from the top of the bentonite seal to the surface. Well MW-1 was finished by installation of a locking cap inside a Christy box.

The monitoring well was developed by over-pumping and surge blocking on May 3, 1990. Development continued until the groundwater was free from fine sand and sediments.

After development, WA obtained a groundwater sample from well MW-1 on May 3, 1990. Prior to obtaining the sample, the well was purged (using a pre-steam-cleaned Teflon bailer) of at least three well volumes of water with care being taken not to purge the well dry. During the purging of the well, the pH, conductivity, and temperature of the water were periodically measured. The water sample for chemical analysis was obtained only after these parameters stabilized. Appendix B contains the field sampling records.

The samples for chemical analysis were obtained using a clean Teflon bailer. Water was poured directly from the bailer into appropriate containers which were labeled, placed in a ziplock bag to prevent immersion and immediately chilled in an ice chest.

D. DISCUSSION OF CHEMICAL ANALYSIS

1. Soil Samples

Four soil samples from a depth of 1 to 6 feet were selected for chemical analysis, as they were apparently the most likely to contain any soil contamination. The four soil samples were analyzed by modified EPA SW-846 Method 8015 for total petroleum hydrocarbon-light fractions (TPH-G) and total petroleum hydrocarbon-heavy fractions (TPH-D) and by EPA SW-846, Method 5030 and 8020 for benzene, toluene, ethylbenzene and total xylenes (BTEX), and total oil and grease (TOG) (EPA 9071). Sample 5-2-S-3 was analyzed by EPA Method 8240 for volatile organic compounds (VOCs). Samples 5-2-S-1 and 5-2-S-2 were analyzed for California Administrative Code (CAM)

Title 22 metals. All samples that were analyzed tested non-detectable at the detection limits used for the above compounds except for TOG.

High laboratory analytical values of total oil and grease (EPA 9071) were found in three of the four samples tested: 3,160 ppm in MW-1 (5.5 feet to 6.0 feet); 430 ppm in sample 5-2-D-1 (4.3 feet to 4.8 feet); and 400 ppm in 5-2-S-2 (2.3 feet to 2.8 feet).

2. Groundwater Sample

The groundwater sample was tested by EPA 8240 test method for purgeable halocarbons, and for total petroleum hydrocarbons; the compounds tested for in these analyses were non-detectable at the detection limits used.

E. QUALITY CONTROL REVIEW OF CHEMICAL DATA

WA performed a quality control (QC) review of the analytical results to evaluate potential limitations in the applicability of the data, which may result from inaccuracies. The QC review is based on data obtained from Mid-Pacific Environmental Laboratory (Mid-Pacific), the analytical contractor. The QC data and chains-of-custody which form the basis for this review, are presented in Appendix B.

1. Groundwater Sample

Sample MW-1, from monitoring well MW-1, was tracked under chain-of-custody from sample collection until receipt by Mid-Pacific. The TPH-G and 8240 analyses were performed within the applicable EPA-specified or RWQCB-specified holding time. The BTEX analyses were held for 12 days, 5 days beyond the RWQCB-specified holding time. Loss of these compounds may have resulted by volatilization. For the TPH-G/BTEX analysis, surrogate spike recoveries and matrix spike/matrix spike duplicate (MS/MSD) recoveries were acceptable. Relative percent differences (RPDs), a measure of the precision of a batch of samples, were judged acceptable for toluene, ethylbenzene and xylenes. The RPD of 22 percent for benzene is higher than acceptable; this may have resulted in inaccurate quantification, had benzene been present. Laboratory blanks were apparently uncontaminated. For the EPA Method 8240 analysis, surrogate spike recoveries, MS/MSD recoveries and RPDs were within EPA-specified limits. Laboratory blanks were apparently uncontaminated.

2. Soil Samples

Four soil samples, L-1, 5-2-S-1, 5-2-S-2, and 5-2-S-3, were tracked under chain-of-custody from sample collection until receipt by Mid-Pacific. All analyses were performed within the applicable EPA-specified or RWQCB-specified holding times.

For the TPH-G/BTEX analyses of each sample, surrogate spikes were within EPA-specified limits. Although no regulatory agency-specified limits are available for MS/MSD recoveries and RPDs, these were acceptable based on professional judgement. Laboratory blanks were apparently uncontaminated. For the TPH-D and other petroleum hydrocarbon analyses, MS/MSD recoveries and RPDs were judged acceptable in the lack of regulatory agency-specified limits. Laboratory blanks were apparently uncontaminated. For the analysis of sample 5-2-S-3 by EPA Method 8240, surrogate spike recoveries, MS/MSD recoveries and RPDs were within EPA-specified limits. Laboratory blanks were apparently uncontaminated.

Samples 5-2-S-1 and 5-2-S-2 were analyzed for the 17 CAM metals. In the absence of regulatory agency-specified QC limits for these analyses, WA typically considers acceptable MS/MSD recoveries of 70 to 130 percent and RPD values of less than or equal to 30 percent. Except for selenium, all MS/MSD recoveries were acceptable. RPD values were all acceptable. The laboratory blank was apparently uncontaminated.

3. Summary

The analytical data appears of acceptable quality. The only significant problem was the exceeded holding time for the BTEX analysis of MW-1. BTEX may have volatilized from the sample container; however, BTEX was also analyzed for by EPA Method 8240 on MW-1, and all QC criteria were met for this sample. Thus, the exceeded holding time is not of paramount significance.

F. CONCLUSIONS

The contamination on-site seems to be limited to the soil only, specifically the fill. The most likely source of this oil and grease contamination would be activities associated with the Wrigley-Ford/Berryessa Creeks levee construction, which took place in late 1976. At that time, the site appeared to be a staging area for earth-moving equipment, allowing many opportunities for oil and grease spillage and/or improper disposal practices. Conversely, the levee material may have been imported from off-site already in a contaminated condition.

G. RECOMMENDATIONS

Due to relatively high concentrations (’400 to 3,160 ppm) of oil and grease and the shallow depth to groundwater, less than 25 feet, it is recommended that additional soil samples be collected to further delineate the zone of contamination.

Of special concern is the 10 feet of fill directly underlying the site. Additional samples should be taken from this area to better define the lateral and vertical extent of contamination.

H. LIMITATIONS

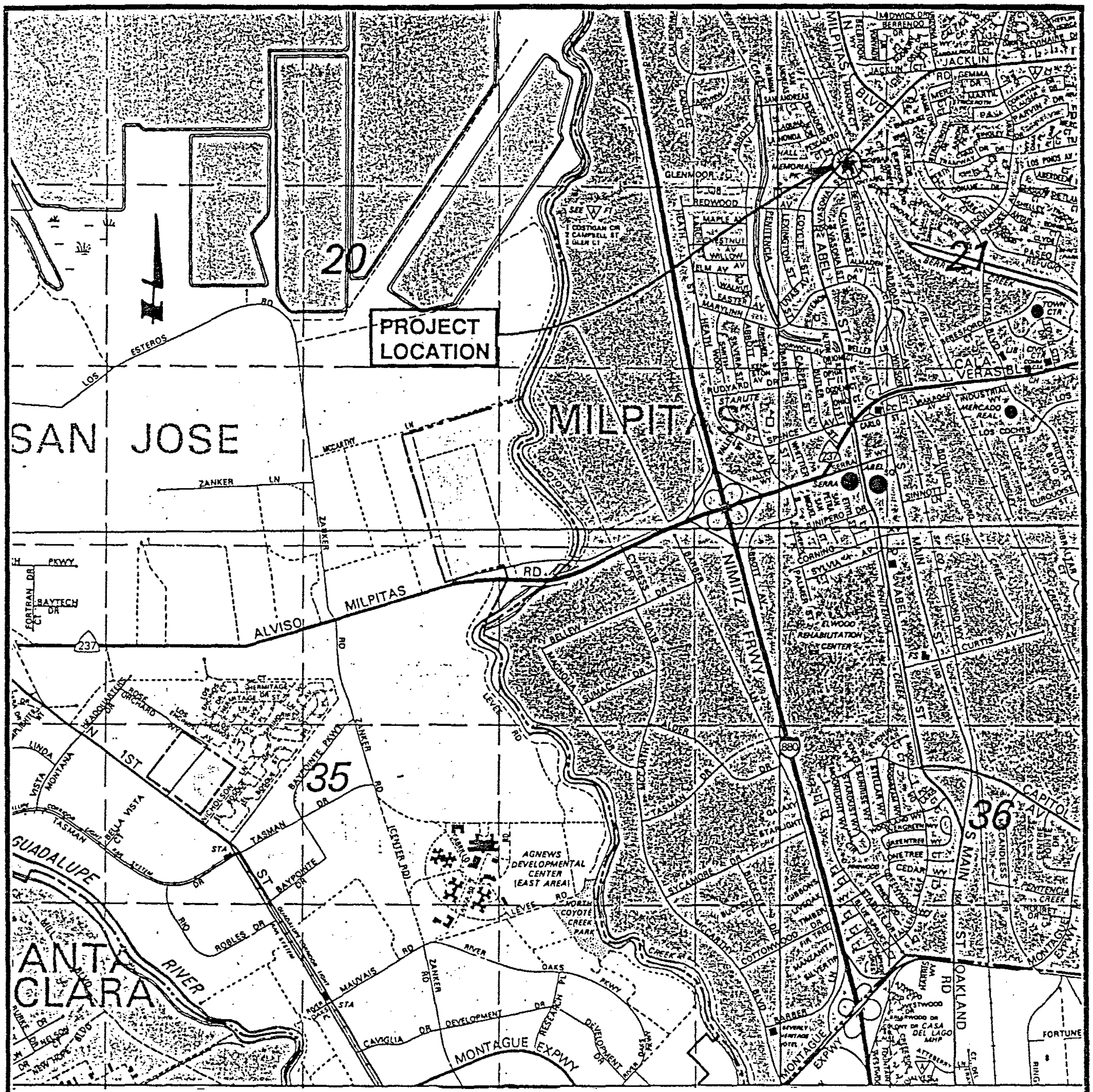
The data, information, interpretations, and recommendations contained in this technical report are presented solely as preliminary bases and guides to the existing environmental conditions of the Wrigley-Ford-Berryessa Creeks site. The conclusions and professional opinions presented herein were developed by Wahler Associates in accordance with generally accepted engineering principles and practices. As with all geotechnical and environmental reports, the opinions expressed here are subject to revisions in light of new information which may be developed in the future, and no warranties are expressed or implied.

This report has not been prepared for use by parties other than Nolte and Associates and SCVWD. It may not contain sufficient information for the purposes of other parties or other uses. If any changes are made in the project as described in this report, the conclusions and recommendations contained herein should not be considered valid, unless the changes are reviewed by Wahler Associates, and the conclusions and recommendations are modified or approved in writing.

Soil deposits may vary in type, strength and many other important properties between points of observation and exploration. Additionally, changes can occur in groundwater and soil moisture conditions due to seasonal variations, or for other reasons. Furthermore, the distribution of chemical concentrations in the soil and groundwater can vary spatially and over time. The chemical analysis results, valid as of the present time only, are based on data collected at the sampling locations only. Therefore, it must be recognized that WA does not and cannot have complete knowledge of the subsurface conditions underlying the subject site. The opinions presented are based upon the findings at the points of exploration and upon interpretative data, including interpolation and extrapolation of information obtained at points of observation.

I. PERFORMANCE

This report was prepared under the supervision of Fred Seirafi, Principal Engineer. Project Manager was Bill Lawson, Senior Hydrogeologist. Field work was conducted by Rick Heidrick, Staff Technician/Geologist. The report was prepared by Rick Heidrick and Bill Lawson. Technical review was provided by Jose Landazuri, Principal Engineer, Mike Pinto, Staff Geologist, and Bill Knight, Staff Chemical Engineer.



BASE FROM THOMAS BROS. MAP

SCALE

0 1/2 1 MILE

Wahler Associates

PALO ALTO • CALIFORNIA

WRIGLEY- FORD CREEK PUMP STATION
MILPITAS, CALIFORNIA

SITE LOCATION MAP

PROJECT NO.	DATE	FIGURE NO.
GSN-129H	JUNE 1990	1

APPENDIX A

BORING LOCATION: See Figure 2	APPROVED BY: RLL	GROUND EL: ≈17.5'
DEPTH/ELEV.WATER : 19.0'	DRILL CONTRACTOR: HEW Drilling	TOTAL DEPTH: 35.5'
DRILL RIG: CME-55 BORING DIA.: 8"	DATE DRILLED: 5-1-90	LOGGED BY: RBH

SOIL CLASS	DESCRIPTION	DEPTH	SAMPLE NO.	PR / RQD	REC.	MODE	REMARKS
CL	FILL 0.0' - 9.0' SANDY CLAY: moderate brown; moist; medium plasticity; 25-35% predominantly fine sand; some medium sand.	0 2				HA	0.0' - 3.5' Advance boring using 8" hollow stem augers (HA). Modified California Sampler and 2" Standard Penetration (SPT) Using 140lb auto hammer with 30" drop, or 3" x 2.5' shlby tube push sample (P).
	4.8' color change to black; caliche nodules, occadional organics	4	L-1 L-2	4 6 9	0.8' / 1.5'	DR	4.0' - 5.5'
		6 8	L-3			HA	
CL	ALLUVIUM 9.0' - 15.5' SILTY CLAY: very dark brown; moist; stiff; medium plasticity.	10	L-4	5 7 8	0.8' / 1.5'	DR	9.0' - 10.5'
		12				HA	
		14	S-1	300 psi	2.3' / 2.5'	P	14.0' - 16.25'
CL	15.5' - 19.0' SANDY CLAY: yellowish brown moist; stiff, medium plasticity; 30-40% fine sand; gray mottling.	16 18				HA	*No recovery after first SPT attempt. Placed catcher in sampler & recovered push sample 1.5'/1.5'
SM/ML	19.0' - 24.5' SILTY SAND/SANDY SILT: moderate brown; wet; medium dense; fineand very fine sand; 45-55% non-plastic fines; gray mottling; occasional lenses of fine gravel.	20	B-1	4 5	NR*	DR/P	▽ Water first encountered at 19.0'. SPT

Wahler Associates

WRIGLEY- FORD CREEK PUMP STATION

EXPLORATION BORING LOG		**BORING NO.**
PROJECT NO. **GSN-128A**	SHEET: 1 of 2	**WB - 1**

BORING LOCATION: See Figure 2	APPROVED BY: RLL	GROUND EL: ≈17.5'
DEPTH/ELEV. WATER : 19.0'	DRILL CONTRACTOR: HEW Drilling	TOTAL DEPTH: 35.5'
DRILL RIG: CME-55 / BORING DIA.: 8"	DATE DRILLED: 5-1-90	LOGGED BY: RBH

SOIL CLASS	DESCRIPTION	DEPTH	SAMPLE NO.	PR / RQD	REC.	MODE	REMARKS
SM/ML	19.0' - 24.5' SILTY SAND (con't.)	20	B-1	7		DR/P	
		22				HA	
SP/SM	24.5' - 35.5' SAND/SILTY SAND: dark brown; wet; loose; predominantly fine; some medium sand; varies from 10-30% fines; occasional lenses of sandy silt/silty sand.	24	B-2 B-3	2 3 4	1.5' 1.5'	DR	24.0' - 25.5'
		26				HA	
		28					
	30.0' 30.5' SANDY SILT/SILTY SAND: dark gray; wet; loose; very fine sand; 40-50% non-plastic fines.	30	B-4 B-5	3 3 4	1.5' 1.5'	DR	29.0' - 30.5'
		32				HA	
		34	B-6	4 3 6	1.5' 1.5'	DR	34.0' - 35.5'
		36					Terminated boring @ 35.5'. Grouted hole to surface.
		38					
		40					

DATA ON THIS LOG ARE AN APPROXIMATION OF THE GEOLOGIC AND SUBSURFACE CONDITIONS BECAUSE THE INFORMATION WAS OBTAINED FROM INDIRECT, DISCONTINUOUS, AND POSSIBLY DISTURBED SAMPLING NECESSITATED BY USE OF SMALL-DIAMETER HOLES. ROTARY AND WASH BORING HOLES HAVE FURTHER COMPLICATIONS IN THIS REGARD BECAUSE OF THE NEED TO USE DRILLING FLUID AND/OR CASING IN ADVANCING HOLES.

THIS LOG INDICATES CONDITIONS IN THIS HOLE ONLY ON THE DATE INDICATED AND MAY NOT REPRESENT CONDITIONS AT OTHER LOCATIONS AND ON OTHER DATES. ANY WATER LEVELS SHOWN ARE SUBJECT TO VARIATION.

THIS HOLE WAS LOGGED IN SUCH A WAY AS TO PROVIDE DATA PRIMARILY FOR DESIGN PURPOSES AND NOT NECESSARILY FOR THE PURPOSES OF SPECIFIC CONTRACTORS.

THE STRATIFICATION LINES OR DEPTH INTERVALS REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN MATERIAL TYPES, AND THE TRANSITIONS MAY BE GRADUAL.

SOIL CLASSIFICATIONS SHOWN ON LOGS ARE FIELD CLASSIFICATIONS BASED ON THE UNIFIED SOILS CLASSIFICATION SYSTEM.

Wahler Associates	WRIGLEY- FORD CREEK PUMP STATION	EXPLORATION BORING LOG		BORING NO.
		PROJECT NO.	SHEET: 2 of 2	
		GSN-128A		WB - 1

BORING LOCATION: See Figure 2		APPROVED BY: RLL	GROUND EL: ≈17.5'
DEPTH/ELEV.WATER : 20.0'	DRILL CONTRACTOR: HEW Drilling		TOTAL DEPTH: 36.5'
DRILL RIG: CME-55	BORING DIA.: 8"	DATE DRILLED: 5-2-90	LOGGED BY: RBH

SOIL CLASS	DESCRIPTION	DEPTH	SAMPLE NO.	PR/ROD	REC.	MODE	REMARKS
CL	FILL 0.0' - 10.5' SANDY CLAY: dark brown; moist; very stiff, medium plasticity; 20-30% very fine sand.	0 2 4	L-1			HA	0.0' - 36.5' Advance boring using 8" hollow stem augers (HA). Sample with Standard Penetration (SPT) or Modified California Sampler using 140lb auto hammer with 30" drop. Shelby tube (2.5'x3") push sample(P).
	6.0' - 10.5' 10-20% coarse sand and fine gravel randomly oreinted within sandy clay matrix.	6	L-2 L-3	4 7 10	1.2' 1.5'	DR	5.0' - 6.5'
		8				HA	
CL	ALLUVIUM 10.5' - 15.0' SILTY CLAY: moderate gray; moist; stiff; medium plasticity ; occasional caliche nodules.	10 12	S-1	300 psi	2.3' 2.5'	P	10.0' - 12.5'
		14	L-4			HA	
CL	15.0' - 20.0' SANDY CLAY: yellowish brown; moist; stiff, low to medium plasticity; 30-40% fine sand; rare coarse sand gray mottling.	16	L-5 L-6	5 6 9	1.1' 1.5'	DR	15.0' - 16.5'
		18 20				HA	

Wahler Associates	WRIGLEY- FORD CREEK PUMP STATION	EXPLORATION BORING LOG		BORING NO. WB - 2
		PROJECT NO. GSN-128A	SHEET: 1 of 2	

BORING LOCATION: See Figure 2		APPROVED BY: RLL	GROUND EL: ≈17.5'
DEPTH/ELEV. WATER : 20.0'	DRILL CONTRACTOR: HEW Drilling		TOTAL DEPTH: 36.5'
DRILL RIG: CME-55	BORING DIA.: 8"	DATE DRILLED: 5-2-90	LOGGED BY: RBH

SOIL CLASS	DESCRIPTION	DEPTH	SAMPLE NO.	PR / RQD	REC.	MODE	REMARKS
SM/ML	20.0' - 25.5' ' SILTY SAND/SANDY SILT: moderate brwon; wet; loose; fine and very fine sand; 45-55% non-plastic fines; occasional thin (0.1) gravel lenses; gray mottling.	20	B-1	3 3 4	1.5' 1.5'	DR	▽ Water first encountered at 20.0'. 20.0' - 21.5'
		22 24				HA	
SM/ML	25.5' - 30.0' SANDY SILT/SILTY SAND: olive gray; wet; very loose/soft; fine and very fine sand; 40-50% non-plastic fines; some gray mottling.	26	B-2	0* 2 2	1.5' 1.5'	DR	25.0' - 26.5': Pulled plug and sounded boring inside augers. BOH @ bottom of augers, no sand inside augers. *First 6" penetrated with dead weight of hammer.
		28				HA	
SP	30.0' - 30.5' SAND: dark gray; wet; loose; fine and medium sand; <5% fines.	30	B-3 B-4	3 4 7	1.5' 1.5'	DR	30.0' - 31.5' SPT: Sounded before sampling. Sand at bottom of augers.
SM/ML	30.5' - 35.0' SILTY SAND/SANDY SILT: dark gray;wet; loose to medium dense; fine to very fine sand; 30-40% non-plastic fines.	32 34				HA	
SP	35.0' - 36.2' SAND: dark gray; wet; dense; medium dense; fine and medium sand, predominantly medium; <5% fines.	36	B-5	11 12 23	1.5' 1.5'	DR	35.0' - 31.5': Heavily flowing sands entered 6" up into augers. Pulled augers 1' while pushing SPT (end taped) to 35'. Sample appears undisturbed.
SW	36.2' - 36.5' SAND: dark gray; wet; medium dense; fine to coarse sand; <5% fines.						
		38 40					Terminated boring @ 36.5'. Grouted hole to surface.

DATA ON THIS LOG ARE AN APPROXIMATION OF THE GEOLOGIC AND SUBSURFACE CONDITIONS BECAUSE THE INFORMATION WAS OBTAINED FROM INDIRECT, DISCONTINUOUS, AND POSSIBLY DISTURBED SAMPLING NECESSITATED BY USE OF SMALL-DIAMETER HOLES. ROTARY AND WASH BORING HOLES HAVE FURTHER COMPLICATIONS IN THIS REGARD BECAUSE OF THE NEED TO USE DRILLING FLUID AND/OR CASING IN ADVANCING HOLES.

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SOIL CLASSIFICATIONS SHOWN ON LOGS ARE FIELD CLASSIFICATIONS BASED ON THE UNIFIED SOILS CLASSIFICATION SYSTEM.

Wahler Associates	WRIGLEY- FORD CREEK PUMP STATION	EXPLORATION BORING LOG		BORING NO.
		PROJECT NO.	SHEET: 2 of 2	WB - 2
		GSN-128A		

BORING LOCATION: See Figure 2	APPROVED BY: RLL	GROUND EL: ≈17.5'
DEPTH/ELEV.WATER : 19.0'	DRILL CONTRACTOR: HEW Drilling	TOTAL DEPTH: 40.1'
DRILL RIG: CME-55 BORING DIA.: 8"	DATE DRILLED: 5-2-90	LOGGED BY: RBH

SOIL CLASS	DESCRIPTION	DEPTH	SAMPLE NO.	PR/RQD	REC.	MODE	REMARKS
CL	FILL 0.0' - 10.5' SANDY CLAY: dark brown; moist; stiff; medium plasticity; 30-40% fine sand.	0 2				HA	0.0' - 40.1' Advance boring using 8" hollow stem augers (HA) using Modified California (DR) and Standard Penetration Test (SPT) samples with 140lb auto hammer with 30" drop. Shelby tube (2.5'x3") push sample(P).
		4 6	S-1	700 psi	1.3' 3.0'	P	4.0' - 7.0'
		8	L-1			HA	
		10	L-2	3 3 4	0.8' 1.5'	DR	9.0' - 10.5'
CL	ALLUVIUM 10.5' - 19.0' SANDY CLAY: yellowish brown; moist; very stiff, medium plasticity; 30-40% fine and very fine sand; gray mottling; caliche deposits; black organic nodules.	12	L-3			HA	
		14	L-4 L-5	5 8 9	1.2' 1.5'	DR	14.0' - 15.5'
CL		16 18	L-6			HA	
SM/ML	19.0' - 25.0' SILTY SAND/SANDY SILT: moderate brown; wet; loose; fine to very fine sand; 45-55% non-plastic fines; gray mottling; occasional 6" sandlayers.	20	B-1	2 3 4	1.5' 1.5'	DR	▽ Water first encountered at 19.0'. 19.0' - 20.5'

Wahler Associates	WRIGLEY- FORD CREEK PUMP STATION	EXPLORATION BORING LOG PROJECT NO. GSN-128A	SHEET: 1 of 2	BORING NO. WB - 3

BORING LOCATION: See Figure 2		APPROVED BY: RLL	GROUND EL: ≈17.5'
DEPTH/ELEV. WATER : 19.0'	DRILL CONTRACTOR: HEW Drilling		TOTAL DEPTH: 40.1'
DRILL RIG: CME-55	BORING DIA.: 8"	DATE DRILLED: 5-2-90	LOGGED BY: RBH

SOIL CLASS	DESCRIPTION	DEPTH	SAMPLE NO.	PR/RQD	REC.	MODE	REMARKS
SM/ML	19.0' - 25.1' SILTY SAND (con't.)	20				DR	
		22 24				HA	
SP SM SP SM	24.0' - 25.1' alternating layers of sand and silty sand						
SP/SM	25.1' - 36.7' SAND/SILTY SAND: dark gray; wet; loose; predominantly fine with some medium sand; varies from 10-30% non-plastic fines.	26	B-2 B-3	2 3 6	1.5'/1.5'	DR	24.0' - 25.5': Sounded through augers to 24' before sampling. No inflowing sand.
		28				HA	
	- medium dense	30	B-4	5 8 9	1.5'/1.5'	DR/P	30.0' - 31.5' SPT: Encountered inflowing sands, dificulty pulling plug. Taped end of sampler, pulled up augers 2" redrilled to 30' and pushed sampler to 30'. Sample appears undisturbed.
		32 34				HA	
		36	B-5 B-6	11 12 23	1.5'/1.5'	DR	36.0' - 37.5': Flowing sands again, taped end of sampler, pushed to 36.0' and drove sample. Sample is undisturbed.
SW/SM	36.7' - 40.1' SAND/ SILTY SAND: dark gray; wet; very dense; fine to coarse; 5-15% non-plastic fines; 10-20% fine rounded to 1/4"; decreasing gravel with depth to 5-10%	38				HA	*39.0' - 39.4' appears to be slough,
		40	B-7* B-8	14 39 10/.1*	1.1'/1.1'*	DR	39.0' - 40.5' Terminated boring @ 40.1'. Grouted hole to surface.

DATA ON THIS LOG ARE AN APPROXIMATION OF THE GEOLOGIC AND SUBSURFACE CONDITIONS BECAUSE THE INFORMATION WAS OBTAINED FROM INDIRECT, DISCONTINUOUS, AND POSSIBLY DISTURBED SAMPLING NECESSITATED BY USE OF SMALL-DIAMETER HOLES. ROTARY AND WASH BORING HOLES HAVE FURTHER COMPLICATIONS IN THIS REGARD BECAUSE OF THE NEED TO USE DRILLING FLUID AND/OR CASING IN ADVANCING HOLES.

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Wahler
Associates

**WRIGLEY- FORD CREEK
PUMP STATION**

EXPLORATION BORING LOG

PROJECT NO. **GSN-128A**

SHEET: 2 of 2

BORING NO. WB - 3

BORING LOCATION: See Figure 2	APPROVED BY: RLL	GROUND EL: ≈17.5'
DEPTH/ELEV.WATER :19.0'	DRILL CONTRACTOR: HEW Drilling	TOTAL DEPTH: 36.0'
DRILL RIG: CME-55 / BORING DIA.: 8"	DATE DRILLED: 5-1-90	LOGGED BY: RBH

SOIL CLASS	DESCRIPTION	DEPTH	SAMPLE NO.	PR/RQD	REC.	MODE	REMARKS
CL	FILL 0.0' - 10.5' SANDY CLAY: dark brown; moist; stiff; medium plasticity; 25-35% very fine sand.	0 2 4				HA	0.0' - 36.0' Advance boring using 8" hollow stem augers (HA). Samplinf with 2.5" Modified California split barrel sampler using 2.5" brass sleeves (DR) using 140 lb hammer with 30" drop.
	6.0' - 10.5' 5-15% fine gravel, rounded.	6	L-1	4 5 10	1.2' 1.5'	DR	WELL CONSTRUCTION 0.0' - 24.5' blank 2" Sch 40 PVC (threaded) 24.5' - 34.5' slotted (.01) 2" Sch 40 PVC (threaded)
		8				HA	SAND AND SEAL 0.0' - 20.0' grout 20.0' - 23.5' Bentonite 23.5' - 36.0' native sand* *Heaving sand intruded augers to 23.5', no chance of placing filter pack.
CL SM CL	ALLUVIUM 10.5' - 15.5' SILTY CLAY: moderate gray; very moist; stiff; medium plasticity ; <5% sand.	10	L-2	2 4 5	1.2' 1.5'	DR	10.0' - 11.5'
	11.0' - 11.5' SILTY SAND: olive gray; moist; loose; medium sand; 5-15% non-plastic fines; occasional organics.	12 14				HA	Water @ 13.0' @ 11:20
CL	15.5' - 19.0' SANDY CLAY: yellowish brown moist; stiff, medium plasticity; 25-35% fine sand; gray and orange mottling; occasional caliche deposits; occasional black organics.	16	L-3	5 5 7	1.4' 1.5'	DR	15.0' - 16.5'
SM/ML	19.0' - 24.0 SILTY SAND/SANDY SILT: moderate brown with gray mottling; wet; medium dense; fine sand; 45-55% non-plastic fines; rare fine gravel.	18 20				HA	▽ Water first encountered at 19.0'.

Wahler Associates	WRIGLEY- FORD CREEK PUMP STATION	**EXPLORATION BORING LOG**	BORING NO.
		PROJECT NO. **GSN-129H** / SHEET: 1 of 2	MW - 1

BORING LOCATION: See Figure 2	APPROVED BY: RLL	GROUND EL: ≈17.5'
DEPTH/ELEV. WATER : 19.0'	DRILL CONTRACTOR: HEW Drilling	TOTAL DEPTH: 36.5'
DRILL RIG: CME-55 BORING DIA.: 8"	DATE DRILLED: 5-1-90	LOGGED BY: RBH

SOIL CLASS	DESCRIPTION	DEPTH	SAMPLE NO.	PR/RQD	REC.	MODE	REMARKS
SM/ML	19.0' - 24.0' SILTY SAND (con't.)	20	L-4	3 5 6	NR*	DR/P	*No recovery on drive sample. Placed satcher in sampler, re-entered hole and reoverd 1.5'/1.5' push sample
		22 24				HA	
SP/SM	24.5' - 35.5' SAND/SILTY SAND: dark gray; wet;medium dense; predominantly fine;some medium sand; varies from 0-30% fines.	26	L-5	6 8 8	1.5' 1.5'	DR	25.0' - 26.5'
		28				HA	
	30.0' predominantly medium sand	30	L-6	4 5 7	1.3' 1.5'	DR	30.0' - 31.5'
		32 34				HA	
SW	35.5' - 36.0' GRAVELLY SAND: dark gray; wet; very dense; coarse to fine sand; 30-40% fine gravel to 1/4" diameter, rounded; <5% fines.	36	L-7	27 32	1.0' 1.0'	DR	35.0' - 36.0' Encountered heaving sands, 10' of sand up in auger. Pushed through before sampling. Driller placed duct tape over end of sampler to keep out slough before drive sample. May have contaminated L-7
		38 40					Terminated boring @ 36.0'.

DATA ON THIS LOG ARE AN APPROXIMATION OF THE GEOLOGIC AND SUBSURFACE CONDITIONS BECAUSE THE INFORMATION WAS OBTAINED FROM INDIRECT, DISCONTINUOUS, AND POSSIBLY DISTURBED SAMPLING NECESSITATED BY USE OF SMALL-DIAMETER HOLES. ROTARY AND WASH BORING HOLES HAVE FURTHER COMPLICATIONS IN THIS REGARD BECAUSE OF THE NEED TO USE DRILLING FLUID AND/OR CASING IN ADVANCING HOLES.

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Wahler Associates	WRIGLEY- FORD CREEK PUMP STATION	**EXPLORATION BORING LOG**		BORING NO.
		PROJECT NO. **GSN-129H**	SHEET: 2 of 2	MW - 1

APPENDIX B

MID-PACIFIC ENVIRONMENTAL LABORATORY

Wahler Associates
1023 Corporation Way
Palo Alto, CA 94303

May 18, 1990
MPELI ID: 9005020
Client PO: GSN-129H
Page 1 of 13 #623

Attention: Mr. Bill Lawson

Subject: Analysis of 4 Soil Samples, Received 5/3/90.

Soil samples were analyzed for benzene, toluene, ethyl benzene, total xylenes (BTEX), and gasoline according to the guidelines established in the Regional Water Quality Control Board (RWQCB) Leaking Underground Fuel Tank (LUFT) manual. Results are presented in Table 1. The method for BTEX and gasoline can be summarized as follows:

> Samples are extracted using purge and trap grade methanol. An aliquot of sample is added to organic free water and introduced into a purge and trap apparatus. Helium is bubbled through the water contained in a specially designed purging chamber. Low boiling petroleum hydrocarbons are efficiently transferred from aqueous phase to the vapor phase. After purging is completed, the sorbent column is heated and back-flushed with helium to desorb the purgeables onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate BTEX and other components of gasoline. BTEX is detected using a photoionization detector (PID) and gasoline is detected using a flame ionization detector (FID). Other petroleum hydrocarbons may be quantified using this technique.

Soil samples were analyzed for higher boiling petroleum hydrocarbons using guidelines established in the Regional Water Quality Control Board (RWQCB) Leaking Underground Fuel Tank (LUFT) manual. This method is also known as the modified 8015 protocol. Results are summarized in Table 2. The method can be summarized as follows:

> Higher boiling petroleum hydrocarbons such as diesel, kerosene and motor oil are extracted into organic solvent and analyzed using a gas chromatograph equipped with an FID.

Samples were analyzed for purgeable organic compounds according to U.S. EPA Method 8240 (Test Methods for Evaluating Solid Waste - SW846, 3rd Ed.,1986). Results are presented in Table 3. The method can be summarized as follows:

> Helium is bubbled through a measured aliquot of sample in organic free water contained in a specially designed purging chamber. The purgeable volatile organic compounds are efficiently transferred from the aqueous phase to the vapor phase. The vapor is swept through a sorbent column where the purgeables are trapped. After purging is completed, the trap is heated and back flushed with helium to desorb the purgeables onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate the purgeables that are then detected with a mass spectrometer.

Qualitative identification of the priority pollutants is performed initially using the relative retention times and the relative abundance of three unique ions. The entire mass spectrum is checked before any final identifications are recorded. Quantitative analysis is performed by the internal standard method using a single characteristic ion and response factors obtained from a daily calibration standard. In the tables, an entry such as "<5" means that the compound was not found at a level above the laboratory's reporting limit. The reporting limit, which is based on EPA reporting levels, has been corrected for any sample dilution.

Prior to analysis, every sample is spiked with surrogate compounds as part of Mid-Pacific's Quality Control Program. These compounds simulate the behavior of compounds of interest and confirm that acceptable recoveries are being achieved on every sample. The results of surrogate recoveries are reported with the sample results.

The samples were digested using EPA method 3050 prior to analysis. The digestate was analyzed for requested metals using Inductively Coupled Argon Plasma Spectroscopy or Atomic Absorption spectrophotometry following Test Methods for Evaluating Solid Waste (SW-846 3rd. Ed.,1986). The EPA method employed is listed alongside of the parameter. The results are presented in Table 4.

Soil samples were analyzed for requested general chemical parameters following Test Methods for Evaluating Solid Wastes (SW-846, 3rd Ed.,1986). EPA methods employed are listed next to the parameters in Table 5.

If you should have any technical questions, please contact the undersigned at (415)964-0844.

Approved by: Daniel L. Middleton
Daniel L. Middleton
Client Services Manager

These results were obtained by following standard laboratory procedures; the liability of Mid-Pacific Environmental Laboratory, Inc. shall not exceed the amount paid for this report. In no event shall Mid-Pacific be liable for special or consequential damages.

Table 1. BTEX Results

	Wahler Assoc. Sample ID				
Low Boiling Petroleum Hydrocarbons	L-1	5-2 S-1	5-2 S-2	5-2 S-3	MeOH Blank
	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Benzene	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	<5.0	<5.0	<5.0	<5.0	<5.0
Total Xylenes	<5.0	<5.0	<5.0	<5.0	<5.0
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Gasoline	<1.0	<1.0	<1.0	<1.0	<1.0
Date Analyzed:	5/14/90	5/15/90	5/15/90	5/15/90	5/14/90
Gasoline surrogate	Percent Recoveries (%)				
Bromofluorobenzene:	104	102	101	103	93

Table 1. BTEX Results (Continued)

Wahler Assoc. Sample ID

Low Boiling Petroleum Hydrocarbons	Storage Blank	Spike	Dup Spike	MeOH Blank	Storage Blank
	ug/kg	% Recov	% Recov	ug/kg	ug/kg
Benzene	<5.0	80	86	<5.0	<5.0
Toluene	<5.0	87	86	<5.0	<5.0
Ethylbenzene	<5.0	94	97	<5.0	<5.0
Total Xylenes	<5.0	91	98	<5.0	<5.0
	mg/kg	% Recov	% Recov	mg/kg	mg/kg
Gasoline	<1.0	NS	NS	<1.0	<1.0
Date Analyzed:	5/14/90	5/14/90	5/14/90	5/15/90	5/15/90

Gasoline surrogate	Percent Recoveries (%)				
Bromofluorobenzene:	114	92	86	92	103

NS - Not spiked

Table 2. Petroleum Hydrocarbon Results

Wahler Assoc. Sample ID

8015 Compounds	L-1	5-2 S-1	5-2 S-2	5-2 S-3	Method Blank
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Diesel	<5.0	<1.0	<1.0	<1.0	<1.0
Kerosene	<5.0	<1.0	<1.0	<1.0	<1.0
Motor Oil	60	<10.0	<10.0	<10.0	<10.0
Date Extracted:	5/7/90	5/7/90	5/7/90	5/7/90	5/7/90
Date Analyzed:	5/10/90	5/10/90	5/10/90	5/10/90	5/10/90

Table 3. Volatile Organic Results

Wahler Assoc. Sample ID

	5-2	Method	Storage		Dup
	S-3	Blank	Blank	Spike	Spike
8240 Compounds	ug/kg	ug/kg	ug/kg	% Recov	% Recov
Chloromethane	<10	<10	<10	NS	NS
Vinyl chloride	<10	<10	<10	NS	NS
Bromomethane	<10	<10	<10	NS	NS
Chloroethane	<10	<10	<10	NS	NS
Trichlorofluoromethane	<5	<5	<5	NS	NS
1,1-Dichloroethene	<5	<5	<5	106	94
Carbon Disulfide	<5	<5	<5	NS	NS
Acetone	<20	<20	<20	NS	NS
Methylene chloride	<5	<5	<5	NS	NS
trans-1,2-Dichloroethene	<5	<5	<5	NS	NS
1,1-Dichloroethane	<5	<5	<5	NS	NS
Vinyl acetate	<10	<10	<10	NS	NS
2-Butanone	<10	<10	<10	NS	NS
Chloroform	<5	<5	<5	NS	NS
1,1,1-Trichloroethane	<5	<5	<5	NS	NS
Carbon tetrachloride	<5	<5	<5	NS	NS
Benzene	<5	<5	<5	95	90
1,2-Dichloroethane	<5	<5	<5	NS	NS
Trichloroethene	<5	<5	<5	91	88
1,2-Dichloropropane	<5	<5	<5	NS	NS
Bromodichloromethane	<5	<5	<5	NS	NS
2-Chloroethylvinylether	<10	<10	<10	NS	NS
cis-1,3-Dichloropropene	<5	<5	<5	NS	NS
4-Methyl-2-pentanone	<10	<10	<10	NS	NS
Toluene	<5	<5	<5	85	84
trans-1,3-Dichloropropene	<5	<5	<5	NS	NS
1,1,2-Trichloroethane	<5	<5	<5	NS	NS
Tetrachloroethene	<5	<5	<5	NS	NS
2-Hexanone	<10	<10	<10	NS	NS
Dibromochloromethane	<5	<5	<5	NS	NS
Chlorobenzene	<5	<5	<5	82	79
Ethylbenzene	<5	<5	<5	NS	NS
Total xylenes	<5	<5	<5	NS	NS
Styrene	<5	<5	<5	NS	NS
Bromoform	<5	<5	<5	NS	NS
1,1,2,2-Tetrachloroethane	<5	<5	<5	NS	NS
Date Analyzed	5/15/90	5/15/90	5/15/90	5/15/90	5/15/90

NS - Not spiked

Table 4. Metals Results

Parameter	EPA Method	Wahler Assoc. Sample ID 5-2 S-1 mg/kg	5-2 S-2 mg/kg	Spike % Recov	Dup Spike RPD	Method Blank mg/L
Antimony	7041	<0.5	<0.5	101	11	<0.005
Arsenic	7060	14.0	3.3	103	17	<0.005
Barium	6010	157	153	78	23	<0.01
Beryllium	6010	<0.5	<0.5	108	5.4	<0.005
Cadmium	6010	<0.5	<0.5	83	1.7	<0.005
Chromium	6010	49.8	38.5	87	5.5	<0.01
Cobalt	6010	9.6	9.4	90	6.5	<0.01
Copper	6010	42.8	23.4	119	1.9	<0.01
Lead	7421	8.7	7.8	114	10	<0.001
Mercury	7471	<0.1	<0.1	114	8.7	<0.001
Molybdenum	6010	<1.0	<1.0	85	5.6	<0.01
Nickel	6010	69.2	57.6	110	4.8	<0.02
Selenium	7740	<0.5	<0.5	61	8.7	<0.005
Silver	6010	3.0	2.2	90	5.4	<0.01
Thallium	7841	<0.5	<0.5	75	17	<0.005
Vanadium	6010	38.1	30.9	72	6.6	<0.01
Zinc	6010	59.0	56.6	129	4.8	<0.01

Table 4. Metals Results

Wahler Assoc. Sample ID

Parameter	EPA Method	Method Detection Limit mg/kg
Antimony	7041	0.5
Arsenic	7060	0.5
Barium	6010	1.0
Beryllium	6010	0.5
Cadmium	6010	0.5
Chromium	6010	1.0
Cobalt	6010	1.0
Copper	6010	1.0
Lead	7421	0.1
Mercury	7471	0.1
Molybdenum	6010	1.0
Nickel	6010	2.0
Selenium	7740	0.5
Silver	6010	1.0
Thallium	7841	0.5
Vanadium	6010	1.0
Zinc	6010	1.0

Table 5. General Chemical Results

Wahler Assoc. Sample ID

Parameter	EPA Method	L-1 mg/kg	5-2 S-1 mg/kg	5-2 S-2 mg/kg	5-2 S-3 mg/kg	Method Spike % Recov
Oil & Grease*	9071 G	3160	430	400	<30	94.9

G - gravimetric

* - All samples are reported to dry-weight basis

Table 5. General Chemical Results

Wahler Assoc. Sample ID

Parameter	EPA Method	Matrix Spike % Recov	Dup RPD	Method Blank mg/L	Method Detection Limit mg/kg
Oil & Grease*	9071 G	93.9	2.1	<5.0	25

G - gravimetric

* - All samples are reported to dry-weight basis

Wahler Associates
1023 Corporation Way
P.O. Box 10023
Palo Alto, CA 94303
FAX: (415) 968-5365
(415) 968-6250

CHAIN OF CUSTODY FORM

Laboratory: ~~ACUREX~~
Turnaround Time: 2 weeks
Results To: Bill Lawson

Serial Number: 623
WA Authorization: A.C.
Sheet 1 of 1
Samplers: MIKE CHEN
Recorder: Mike Chen
signature required

Project: SCVWD PUMP STA. Milpitas
Job Number: GSN-129H
Project Manager: Bill Lawson
Date: 5/2/1990

9005-020
R2152

ITEM NO.	SAMPLE NUMBER	DATE AND TIME SAMPLED Date	Time	MATRIX	# CONTAINERS & PRESERVATIVES UNPRESERVED	H_2SO_4	HNO_3	HCl			ANALYSIS REQUESTED / TYPE OF CONTAINER TPH-G + BTEX	TPH-D	TOG Total Oil Grease	EPA-8240	22 METALS CAM			COMMENTS
1	L-1	5/1/90	9:10	SOIL							Brass liner →	→	→					TPH-G & D, TOG + BTEX
2	~~L-2~~	↓	~~9:15~~	↓														
3	~~L-3~~		~~9:25~~															
4	~~L-4~~		~~9:39~~															
5	~~L-5~~		~~10:20~~															
6	~~L 6~~		~~10:25~~															
7	~~L-7~~	↓	~~11:00~~															
8	~~6 6~~																	
9	5-2-S-1	5/2/90	11:55								Brass liner →	→	→		Brass liner			TPH-G & D + BTEX, TOG & 22 metals
10	5-2-S-2	↓	12:06								S	S	S		S			S S
11	5-2-S-3	↓	12:25	↓										Brass liner				TPH-G & D + BTEX, TOG & EPA 8240
12																		

MISCELLANEOUS

Number of Coolers	Type of Coolant
1	Blue ICE

COMMENTS:
Transferred to refrigerator 5/2/90 5:30PM each day.

CHAIN OF CUSTODY RECORD

Relinquished by: (signature & affiliation)	Received by: (signature & affiliation) Date/Time
Mike Chen 5/3/90 5:20pm	
Relinquished by: (signature & affiliation)	Received by: (signature & affiliation) Date/Time
Relinquished by: (signature & affiliation)	Received by: (signature & affiliation) Date/Time
Relinquished by: (signature & affiliation)	Received by: (signature & affiliation) Date/Time
Dispatched by: (signature & affiliation) Date/Time	Received for lab by: Date/Time 5/3/90 5:20pm

LABORATORY COPY WHITE
PROJECT COPY YELLOW
FIELD or OFFICE COPY PINK

MID-PACIFIC ENVIRONMENTAL LABORATORY

Wahler Associates
1023 Corporation Way
Palo Alto, CA 94303

May 17, 1990
MPELI ID: 9005019
Client PO: GSN-129H
Page 1 of 5 #624

Attention: Mr. Bill Lawson

Subject: Analysis of 1 Water Sample, Received 5/3/90.

The water sample was analyzed for benzene, toluene, ethyl benzene, total xylenes (BTEX) and gasoline according to the guidelines established in the Regional Water Quality Control Board (RWQCB) Leaking Underground Fuel Tank (LUFT) manual. Results are presented in Table 1. The method for BTEX and gasoline can be summarized as follows:

> An aliquot of sample is introduced into a purge and trap using a gas-tight syringe. Helium is bubbled through the water contained in a specially designed purging chamber. Low boiling petroleum hydrocarbons are efficiently transferred from aqueous phase to the vapor phase. After purging is completed, the sorbent column is heated and back-flushed with helium to desorb the purgeables onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate BTEX and other components of gasoline. BTEX is detected using a photo ionization detector (PID) and gasoline is detected using a flame ionization detector (FID). Other petroleum hydrocarbons may be quantified using this technique.

The water sample was analyzed for purgeable organic compounds according to U EPA Method 8240 (Test Methods for Evaluating Solid Waste - SW846, 3rd Ed.,1986). Results are presented in Table 2. The method can be summarized as follows:

> Helium is bubbled through a measured aliquot of sample in organic free water contained in a specially designed purging chamber. The purgeable volatile organic compounds are efficiently transferred from the aqueous phase to the vapor phase. The vapor is swept through a sorbent column where the purgeables are trapped. After purging is completed, the trap is heated and back flushed with helium to desorb the purgeables onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate the purgeables that are then detected with a mass spectrometer.

Qualitative identification of the priority pollutants is performed initially using the relative retention times and the relative abundance of three unique ions. The entire mass spectrum is checked before any final identifications are recorded. Quantitative analysis is performed by the internal standard method using a single characteristic ion and response factors obtained from a daily calibration standard. In the tables, an entry such as "<5" means that the compound was not found at a level above the laboratory's reporting limit. The reporting limit, which is based on EPA reporting levels, has been corrected for any sample dilution.

Prior to analysis, every sample is spiked with surrogate compounds as part of Mid-Pacific's Quality Control Program. These compounds simulate the behavior of compounds of interest and confirm that acceptable recoveries are being achieved on every sample. The results of surrogate recoveries are reported with the sample results.

If you should have any technical questions, please contact the undersigned at (415)964-0844.

Approved by: Daniel L. Middleton
Daniel L. Middleton
Client Services Manager

These results were obtained by following standard laboratory procedures; the liability of Mid-Pacific Environmental Laboratory, Inc. shall not exceed the amount paid for this report. In no event shall Mid-Pacific be liable for special or consequential damages.

Table 1. BTEX Results

Wahler Sample ID

Low Boiling Petroleum Hydrocarbons	MW-1	Purge Blank	Storage Blank	Spike	Dup Spike
	ug/L	ug/L	ug/L	% Recov	% Recov
Benzene	<0.5	<0.5	<0.5	93	116
Toluene	<0.5	<0.5	<0.5	99	108
Ethylbenzene	<0.5	<0.5	<0.5	97	97
Total Xylenes	<0.5	<0.5	<0.5	107	105
	mg/L	mg/L	mg/L	% Recov	% Recov
Gasoline	<0.1	<0.1	<0.1	NS	NS
Date Analyzed:	5/15/90	5/15/90	5/15/90	5/15/90	5/15/90
Gasoline surrogate	Percent Recoveries (%)				
Bromofluorobenzene	95	92	103	105	99

NS - Not spiked

Table 2. Volatile Organic Results

Wahler Sample ID

	MW-1	Method Blank	Storage Blank	Spike	Dup Spike
8240 Compounds	ug/L	ug/L	ug/L	% Recov	% Recov
Chloromethane	<10	<10	<10	NS	NS
Vinyl chloride	<10	<10	<10	NS	NS
Bromomethane	<10	<10	<10	NS	NS
Chloroethane	<10	<10	<10	NS	NS
Trichlorofluoromethane	<5	<5	<5	NS	NS
1,1-Dichloroethene	<5	<5	<5	98	98
Carbon Disulfide	<5	<5	<5	NS	NS
Acetone	<20	<20	<20	NS	NS
Methylene chloride	<5	<5	<5	NS	NS
trans-1,2-Dichloroethene	<5	<5	<5	NS	NS
1,1-Dichloroethane	<5	<5	<5	NS	NS
Vinyl acetate	<10	<10	<10	NS	NS
2-Butanone	<10	<10	<10	NS	NS
Chloroform	<5	<5	<5	NS	NS
1,1,1-Trichloroethane	<5	<5	<5	NS	NS
Carbon tetrachloride	<5	<5	<5	NS	NS
Benzene	<5	<5	<5	96	96
1,2-Dichloroethane	<5	<5	<5	NS	NS
Trichloroethene	<5	<5	<5	90	90
1,2-Dichloropropane	<5	<5	<5	NS	NS
Bromodichloromethane	<5	<5	<5	NS	NS
2-Chloroethylvinylether	<10	<10	<10	NS	NS
cis-1,3-Dichloropropene	<5	<5	<5	NS	NS
4-Methyl-2-pentanone	<10	<10	<10	NS	NS
Toluene	<5	<5	<5	90	88
trans-1,3-Dichloropropene	<5	<5	<5	NS	NS
1,1,2-Trichloroethane	<5	<5	<5	NS	NS
Tetrachloroethene	<5	<5	<5	NS	NS
2-Hexanone	<10	<10	<10	NS	NS
Dibromochloromethane	<5	<5	<5	NS	NS
Chlorobenzene	<5	<5	<5	84	84
Ethylbenzene	<5	<5	<5	NS	NS
Total xylenes	<5	<5	<5	NS	NS
Styrene	<5	<5	<5	NS	NS
Bromoform	<5	<5	<5	NS	NS
1,1,2,2-Tetrachloroethane	<5	<5	<5	NS	NS
Date Analyzed	5/9/90	5/9/90	5/9/90	5/9/90	5/9/90

NS - Not spiked

Table 2. Volatile Organic Results

Wahler Sample ID

8240 Surrogates	MW-1	Method Blank	Storage Blank	Spike	Dup Spike
	Percent Recoveries (%)				
1,2-Dichloroethane-d4	101	92	101	95	92
Toluene-d8	101	92	103	96	90
p-Bromofluorobenzene	100	93	102	96	91

Wahler Associates
1023 Corporation Way
P.O. Box 10023
Palo Alto, CA 94303
FAX: (415) 968-5365
(415) 968-6250

CHAIN OF CUSTODY FORM

Laboratory: ~~Acurex~~ Mid-Pacific
Turnaround Time: 2 weeks
Results To: Bill Lawson

Serial Number: 624
WA Authorization: A.C.
Sheet 1 of 1
Samplers: MIKE CHEN
Recorder: signature required

Project: SCVWD PUMP STA. MILPTAS
Job Number: GSN-129H
Project Manager: Bill Lawson
Date: 5/3/1990

9005-019

ITEM NO.	SAMPLE NUMBER	DATE AND TIME SAMPLED		MATRIX	# CONTAINERS & PRESERVATIVES						ANALYSIS REQUESTED / TYPE OF CONTAINER							
		Date	Time		UNPRESERVED	H_2SO_4	HNO_3	HCl				8240		TPH-G, BTEX				COMMENTS
1	MW-1	5/3/90	3:30	H_2O	6V							3V		3V				
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		

MISCELLANEOUS

Number of Coolers	Type of Coolant

COMMENTS:

CHAIN OF CUSTODY RECORD

Relinquished by: (signature & affiliation) Mike Chen 5/3/90 5:20 pm	Received by: (signature & affiliation) Date/Time
Relinquished by: (signature & affiliation)	Received by: (signature & affiliation) Date/Time
Relinquished by: (signature & affiliation)	Received by: (signature & affiliation) Date/Time
Relinquished by: (signature & affiliation)	Received by: (signature & affiliation) Date/Time
Dispatched by: (signature & affiliation) Date/Time	Received for lab by: Date/Time [illegible]

LABORATORY COPY WHITE
PROJECT COPY YELLOW
FIELD or OFFICE COPY PINK

Wahler Associates
Geotechnical and Water
Resources Engineering

WELL DEVELOPMENT FORM

Project No.: GSN-129H
Date: 5-3-90
Well ID.: MW-1
Developed By: MIKE CHEN
Bottom of Well: 37.2
Well Casing Diameter: 2"
# Of times well purged: 1
Day number: 1

Purge Method

☒ Honda pump
☐ 2" purgemaster
☐ Jet pump
☐ 4" purgemaster
☐ Bailer
☐ Other

Initial Water Level / Time	Time Start Pumping	Water Level While Pumping / Time	Time Stop Pumping	Final Water Level / Time	Gallons Removed
16.30 8:40	8:50	26.5 9:00	9:25	26.1 9:35	40
				16.50 9:45	

Groundwater Parameters During Development

Gallons Removed	Time	Temp.	pH	Cond.	Mv	Turbidity
0	8:50	19.4	7.54	9500	-061.1	—
15	9:03	19.5	7.38	10000	-050.5	13.31
25	9:10	19.7	7.40	11000	-051.3	8.01
35	9:20	19.6	7.37	10500	-051.3	3.40
40	9:25	19.8	7.39	10500	-050.4	4.20
Meter serial	numbers =	#222410	#222410	#D90c1668	#222410	# 1

Water Disposal Method: ☒ Drums ☐ Ground surface ☐ Baker Tank & No. / ☐ Other

Well stick up

From grade to top of steel = 2.6'
From black mark to top of steel =

Comments: (Water condition, appearance, etc.)

at first 5 gal. water came out w/ fine sand and silt. after purge 15 gal. water; water came out cleaner. purge 40 gal. water out of the well and water recover fast.

revised 3/1/90 GPS

Wahler Associates

Geotechnical and Water Resources Engineering

GROUND-WATER SAMPLING FORM

Job Number: GSN-129H
Location: MILPITAS
Date: 5-3-90

Well Number: MW-1
Well Type: ☒ Monitor ☐ Extraction ☐ Other:
Well Material: ☒ PVC ☐ Steel ☐ Other
Sampled By: MIKE CHEN

WELL PURGING

PURGE VOLUME

Casing Diameter(ID in inches):
☒ 2" ☐ 4" ☐ 6" ☐ Other
Total Depth of Well (BOW) 37.2
Water level : 16.25 Time: 3:00
Well Volumes To Be Purged: 10.5

Well Volume Factors:

Well Casing ID (inches)		(Vol. Factor)
2.0	----------	0.1632
3.0	----------	0.3672
4.0	----------	0.6528
4.5	----------	0.826
6.0	----------	1.469

Purge Volume:

37.2 (total depth) - 16.25 (water level) = ______ x 0.1632 (Well Vol. Fac.) = ______ x 3 (# of vol. to purge) = ~~5.5~~ 10.5 gallons (calculated purge volume)

PURGE TIME

____ Start ____ Stop ____ Elapsed

ACTUAL VOLUME PURGED

12 gallons

PURGE METHOD

☐ Honda Pump ☐ Bailer ☐ Dedicated Pump ☐ Other

WELL SAMPLING PARAMETERS:

Gallons Removed	Time	Temp. C	pH	Cond. (umhos/cm)	M V	Turbidity (NTU)
0	3:00	24.7	7.56	11500	-063.6	
4	3:05	24.3	7.60	11000	-050.8	
8	3:10	23.5	7.39	11000	-051.2	
12	3:18	23.8	7.39	11000	-051.3	
Meter Serial	Numbers =		#	#	#	#

SAMPLING METHOD:

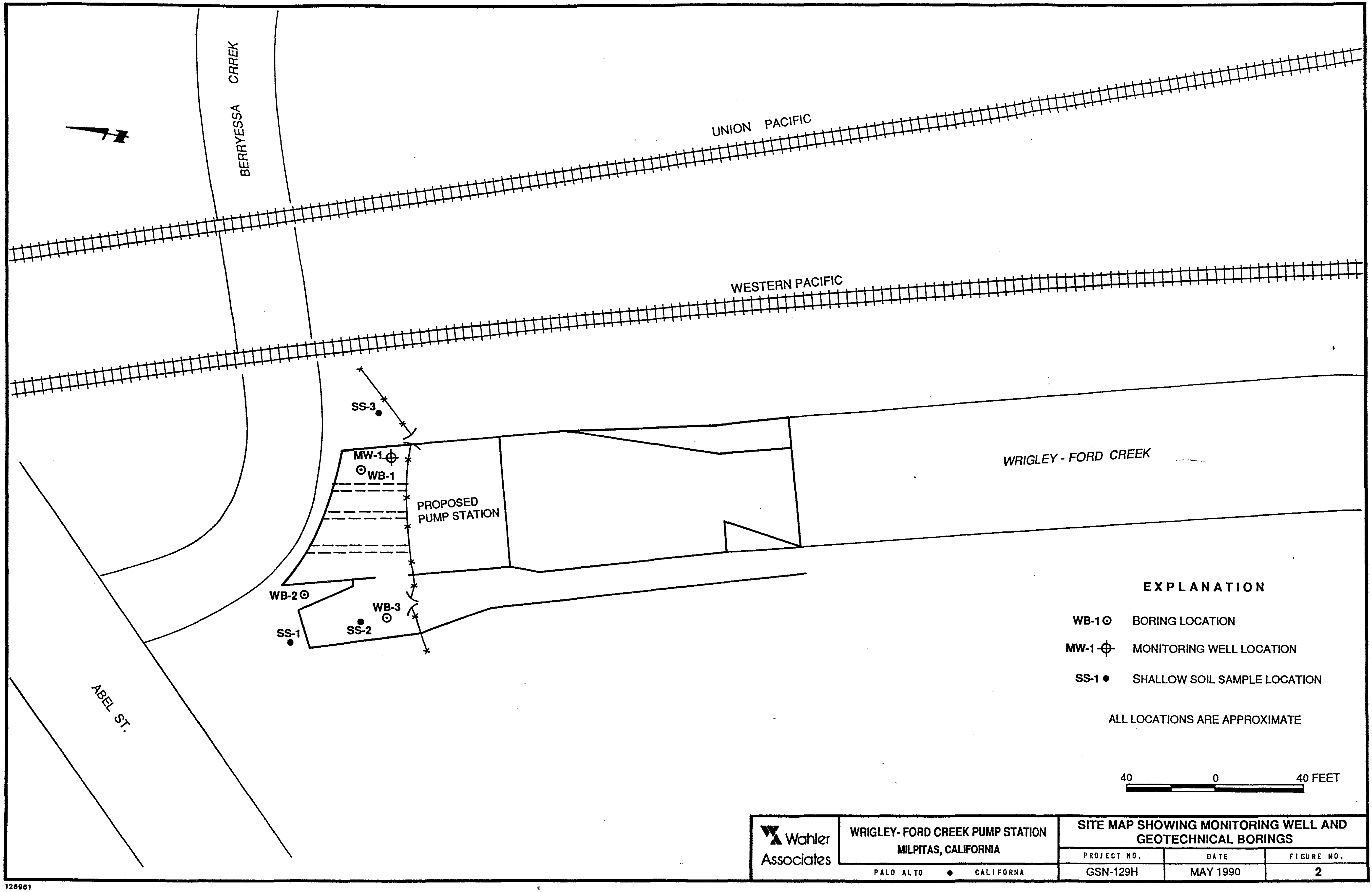
Time Sampled: 3:30

☑ Bailer ☐ Bladder Pump ☐ Other

COMMENTS:

SAMPLES COLLECTED INCLUDING QC SAMPLES

ANALYSIS REQUIRED	No. of	Container type	Preservatives
EPA 8240	3	VOAS	
EPA 8270	/		
EPA 8010			
TPH (Gas) + BTEX	3	VOAS	
METALS			



Wahler Associates

PALO ALTO • CALIFORNA

WRIGLEY- FORD CREEK PUMP STATION
MILPITAS, CALIFORNIA

SITE MAP SHOWING MONITORING WELL AND GEOTECHNICAL BORINGS

PROJECT NO.	DATE	FIGURE NO.
GSN-129H	MAY 1990	2

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